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DEGLI STUDI
DI TRIESTE

Dipartimento di
Ingegneria
e Architettura

TEMPERATURE SENSORS CALIBRATION

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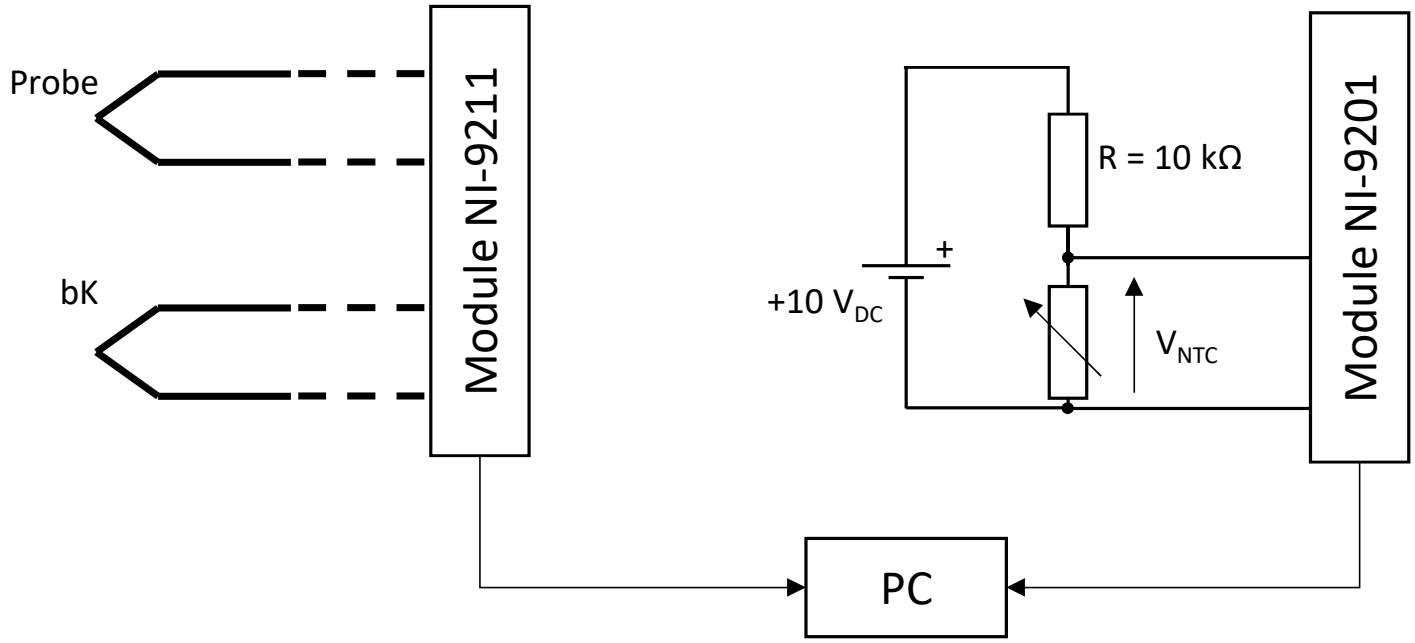
AIM

Record and compare the time response of four different temperature sensors:

1. Insulated K-type thermocouple (Probe)
2. Bare K-type thermocouple (bK)
3. NTC thermistor (10kΩ)

THE SETUP

A c-RIO system (National Instruments Inc.) has been configured to record the voltage difference generated by the thermocouples and to provide an output in °C



THE EXPERIMENT

The hoven will be set to reach 80°C at first and then to cool down to 30°C; the following data are going to be recorded

time	T_{PROBE} (°C)	T_{bK} (°C)	V_{NTC} (V)	T_{REF} (°C)

The following plots have to be realized: $T_{PROBE} = f(t)$, $T_{bK} = f(t)$, $T_{ref} = f(t)$ and $V_{NTC} = f(t)$. Results have to be commented in function of rising time (in seconds) and entity of the overshoot (if present, in terms of percentage variation from the set point).

The NTC was provided with unknown a, b and c parameters for modelling its behaviour? Could the NTC be used someway after this experiment?

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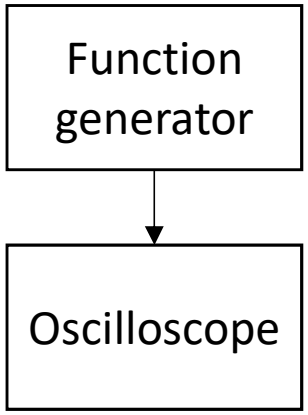
SIGNAL GENERATOR AND OSCILLOSCOPE

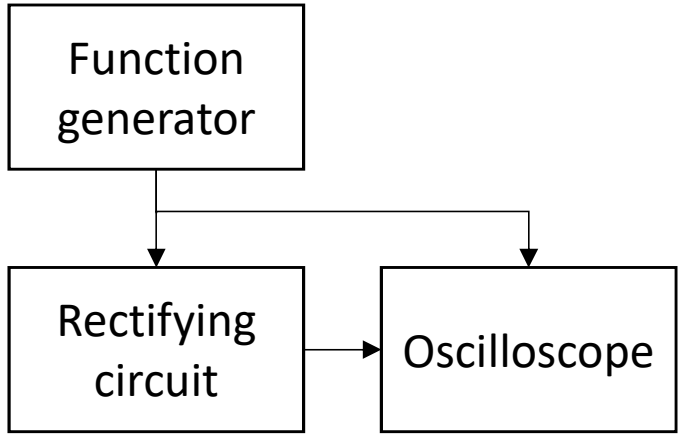
THE SETUP

A function generator (Keysight/Agilent 33220A) and an oscilloscope (Tektronix - TDS2012B) (a) were connected among them at first. Then they have been used to monitor as the signal generated propagates within two different circuits: (b) a rectifier circuit and (c) a low-pass filter

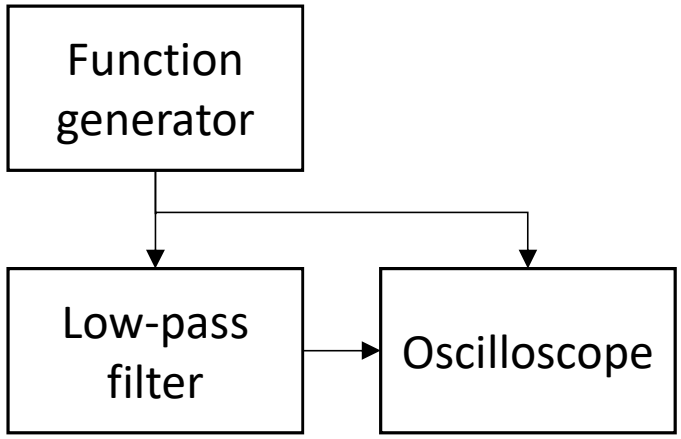
(a)



(b)

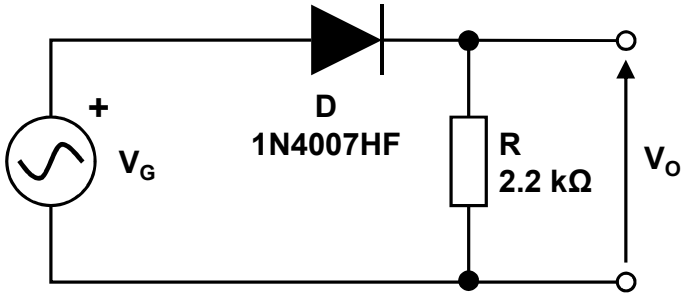


(c)

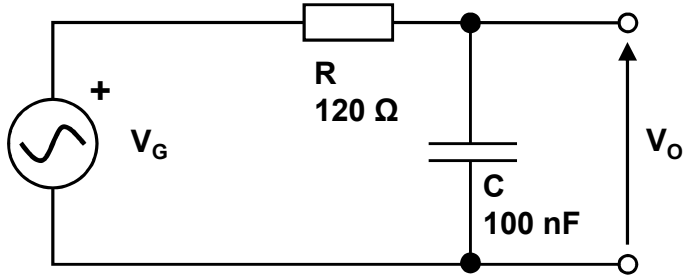


THE SETUP / THE EXCERCISE

Rectifying circuit



Low-pass filter



$$f_{cut} = \frac{1}{2\pi RC}$$

Describe the instruments introduced to you (multimeter, function generator and oscilloscope) and what you have been able to reveal within the two circuits

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